

What is claimed is:

1. A method for treating water comprising the steps of:

(a) adding a chemical coagulant to water containing a pollutant, the water within an enclosure;

5 (b) mixing the water and the coagulant;

(c) permitting coagulation and flocculation to occur;

(d) stopping the mixing;

(e) permitting a floc formed by the coagulation and flocculation to settle to a bottom of the enclosure, the floc containing the pollutant, treated water remaining above the floc thereby free from at least some of the pollutant;

10 (f) removing at least some of the treated water from the enclosure;

(g) adding new water containing a pollutant to the enclosure; and

(h) mixing the new water and the floc to resuspend components of the floc.

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2. The method recited in Claim 1, further comprising the steps of:

(i) repeating steps (c) - (h) until a contaminant removal capability of the coagulant is substantially exhausted;

20 (j) permitting the floc to settle to the enclosure bottom; and

(k) removing the floc from the enclosure.

3. The method recited in Claim 2, further comprising the step, following step (k),
of adding a second dose of coagulant to the enclosure, and repeating steps (b) - (k).

4. The method recited in Claim 1, further comprising the step, following step (h),
5 of adding to the enclosure at least one of a pH buffer, a coagulant aid, and a coagulant.

5. The method recited in Claim 1, wherein the coagulant comprises at least one
of an aluminum or an iron compound.

10 6. The method recited in Claim 1, wherein the pollutant comprises at least one
of a suspended solid, phosphorus, a heavy metal, and a pathogenic organism.

7. The method recited in Claim 1, wherein the enclosure comprises a vessel,
and further comprising the step, prior to step (a), of pumping the water containing a
15 pollutant into the vessel.

8. The method recited in Claim 7, wherein step (g) comprises pumping the new
water into the vessel, and step (f) comprises pumping the treated water out of the vessel.

20 9. The method recited in Claim 8, wherein steps (f) and (g) are performed in one
of a batch mode or a substantially continuous mode.

10. The method recited in Claim 7, further comprising the steps of:

- (i) permitting the floc to settle into a sump positioned adjacent a bottom of the vessel; and
- (j) at predetermined intervals pumping the settled floc out of the sump.

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11. The method recited in Claim 1, wherein the enclosure comprises a discrete column of water within a body of water.

12. The method recited in Claim 11, wherein step (g) comprises pumping the new

10 water into the water column from the body of water, and step (f) comprises pumping the treated water out of the water column into the body of water.

13. The method recited in Claim 12, wherein steps (f) and (g) are performed in one of a batch mode or a substantially continuous mode.

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14. The method recited in Claim 11, wherein the enclosure comprises a movable, substantially vertical barrier located at a first position within the body of water, a bottom of the water column comprising a bottom of the body of water, and further comprising the steps of:

20 (i) permitting the floc to settle to the water body bottom; and

5 (j) periodically moving the vertical barrier to a second position within the water body spaced apart from the first position, leaving the settled floc at the water body bottom of the first location.

10 15. The method recited in Claim 1, further comprising the step, prior to step (e), of positioning a matrix element within the enclosure, and wherein step (e) further comprises permitting the floc to settle onto the matrix, thereby providing additional floc-containing surface area to contact the water within the enclosure.

15 16. The method recited in Claim 15, wherein the matrix comprises a root mat of floating vegetation.

17. The method recited in Claim 16, further comprising the step, prior to step (a), of inoculating floc onto the root mat.

20 18. The method recited in Claim 16, wherein the enclosure comprises a body of water and the enclosure bottom comprises a natural bottom, and further comprising the steps of:

(i) periodically draining the body of water; and
(j) tilling the vegetation, root-mat-associated floc, and floc on the bottom of the body of water into the natural bottom of the body of water.

19. The method recited in Claim 15, wherein the matrix comprises one of a baffle and a filter media.

20. A system for treating water comprising:

5 an enclosure for holding water containing a pollutant;
means for adding a chemical coagulant to water in the enclosure;
means for mixing the water and the coagulant;
means for stopping the mixing means for a time sufficient for a floc formed by the pollutant and the coagulant to settle to a bottom of the enclosure;
10 means for removing at least some of the treated water from the enclosure;
means for adding new water containing a pollutant to the enclosure; and
means for activating the mixing means for mixing the new water and the floc to resuspend components of the floc.

15 21. The system recited in Claim 20, further comprising means for removing the floc from the enclosure.

22. The system recited in Claim 20, further comprising means for adding to the enclosure at least one of a pH buffer, a coagulant aid, and a coagulant.

20 23. The system recited in Claim 20, wherein the coagulant comprises at least one of an aluminum or an iron compound.

24. The system recited in Claim 20, wherein the pollutant comprises at least one of a suspended solid, phosphorus, a heavy metal, and a pathogenic organism.

25. The system recited in Claim 20, wherein the enclosure comprises a vessel, 5 and further comprising a pump for pumping the water containing the pollutant into the vessel.

26. The system recited in Claim 25, wherein the vessel comprises a sump positioned adjacent a bottom thereof for collecting settled floc therein, and wherein the 10 pump is also in fluid communication with the sump, for periodically pumping settled floc out of the sump.

27. The system recited in Claim 20, wherein the enclosure comprises a discrete column of water within a body of water.

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28. The system recited in Claim 27, further comprising a pump for pumping the water containing the pollutant from the body of water into the water column.

29. The system recited in Claim 28, wherein the enclosure comprises a movable, 20 substantially vertical barrier, and further comprising means for moving the barrier from a first position to a second position in the body of water spaced apart from the first position.

30. The system recited in Claim 20, further comprising a matrix element positioned within the enclosure for providing additional surface area to which settling floc can attach, the attached floc thereby providing additional floc-containing surface area to contact the water within the enclosure.

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31. The system recited in Claim 30, wherein the matrix comprises a root mat of floating vegetation.

32. The system recited in Claim 31, wherein the enclosure comprises a body of water and the enclosure bottom comprises a natural bottom, and further comprising means for draining the body of water and means for tilling the vegetation and the settled floc into the natural bottom of the body of water.

33. The system recited in Claim 30, wherein the matrix comprises one of a baffle and a filter media.